DIRECT TESTIMONY

of

SHEENA KIGHT

Finance Department

Financial Analysis Division

Illinois Commerce Commission

Consumers Illinois Water Company
Proposed General Increase In Water Rates

Docket No. 03-0403

September 19, 2003

Table of Contents

Witness Identification 1

Cost Of Capital 2

Capital Structure 3

Cost of Short-term Debt 10

Cost of Long-Term Debt 11

Cost of Preferred Stock 11

Cost of Common Equity 11

Sample Selection 12

DCF Analysis 13

Risk Premium Analysis 18

Cost of Equity Recommendation 29

Overall Cost of Capital Recommendation 30

Response to Ms. Ahern 31

Utility Sample 32

Historical Data 34

DCF Model 37

CAPM Model 41

Risk Premium Model 46

Comparable Earnings Model 52

Size-based Risk Premium 56

Witness Identification

Q. Please state your name and business address.

A. My name is Sheena Kight. My business address is 527 East Capitol Avenue, Springfield, IL 62701.

Q. By whom are you employed and in what capacity?

A. I am employed by the Illinois Commerce Commission ("Commission") as a Financial Analyst in the Finance Department of the Financial Analysis Division.

Q. Please describe your qualifications and background.

A. In May of 1998, I received a Bachelor of Business degree in Finance and Marketing from Western Illinois University in Macomb, Illinois. I earned a Master of Business Administration degree, with a concentration in Finance, also at Western Illinois University in May 2001. I have been employed by the Commission in my present position since January of 2001.

Q. Please state the purpose of your testimony in this proceeding.

A. The purpose of my testimony is to present the overall cost of capital and to recommend a fair rate of return on rate base for Consumers Illinois Water

Company ("Company" or "CIWC"). I will also respond to the direct testimony of CIWC witness Pauline M. Ahern.

Cost Of Capital

Q. Please summarize your cost of capital findings.

A. The overall cost of capital for CIWC is 8.87%, as shown on Schedule 3.01.

Q. Why must one determine an overall cost of capital for a public utility?

A. Under the traditional regulatory model, the proper balance of ratepayer and shareholder interests occurs when the Commission authorizes a public utility a rate of return on its rate base equal to its overall cost of capital. If the authorized rate of return on rate base exceeds the overall cost of capital, then ratepayers bear the burden of excessive prices. Conversely, if the authorized rate of return on rate base is lower than the overall cost of capital, then the utility may be unable to raise capital at a reasonable cost. Ultimately, the utility's inability to raise sufficient capital would impair service quality. Therefore, ratepayer interests are served best when the authorized rate of return on rate base equals the overall cost of capital.

In authorizing a rate of return on rate base equal to the overall cost of capital, all costs of service are assumed reasonable and accurately measured. If

unreasonable costs continue to be incurred, or if any reasonable cost of service component is measured inaccurately, then the allowed rate of return on rate base will not balance ratepayer and investor interests.

Q. Please define the overall cost of capital for a public utility.

A. The overall cost of capital for a public utility equals the sum of the costs of the components of the capital structure (i.e., debt, preferred and preference stock, and common equity) after weighting each by its proportion to total capital.

Capital Structure

Q. What capital structure does the Company propose for determining the rate of return on rate base?

A. The Company proposes determining the rate of return on rate base on the basis of a forecasted average 2004 capital structure. The Company's proposed capital structure appears on Schedule 3.01.

Q. What capital structure do you recommend for setting rates in this proceeding?

A. My proposed capital structure is shown on Schedule 3.01. I also used a forecasted average 2004 capital structure.

Q. What adjustments did you make to the Company's proposed balance of short-term debt?

A. I adjusted the monthly balance of short-term debt to the portion supporting CWIP. To calculate the balance of short-term debt, I first calculated the monthly ending net balance of short-term debt outstanding each month. The net balance of short-term debt is the greater of a) the monthly ending gross balance of short-term debt outstanding minus the corresponding monthly ending balance of construction-work-in-progress ("CWIP") accruing an allowance for funds used during construction ("AFUDC") or b) CWIP accruing AFUDC times the ratio of short-term debt to total CWIP. That adjustment recognizes that the Commission's formula for calculating AFUDC assumes short-term debt is the first source of funds financing CWIP and addresses the concern the Commission raised about double-counting short-term debt balances in a previous Order.[1] Next, I calculated twelve monthly averages from the monthly ending net balances of short-term debt. Finally, I averaged the twelve monthly average net balances of short-term debt for January 2004 through December 2004, which is consistent with the other components of the Company's proposed capital structure. Schedule 3.02 presents the calculation of the average adjusted balance of short-term debt.

Q. Did you make adjustments to the Company's proposed balance of long-term debt?

A. No. However, I made a few minor adjustments to the long-term debt schedule to reconcile it with Company responses to Commission Staff ("Staff") data requests and the Company's annual filling to the Commission. The date issued for long-term debt issues Series N and Series P was changed from 3/15/95 and 7/15/95 to 3/15/91 and 7/24/92, respectively. I also added an issue date and maturity date for Series V. The long-term debt schedule is presented on Schedule 3.03.

Q. Did you make any adjustments to the Company's proposed balance of preferred stock?

A. No. The average balance of preferred stock is presented on Schedule 3.04.

Q. Did you make adjustments to the Company's proposed balance of common equity?

A. No. I did not make any adjustment to the Company's proposed balance of common equity.

Q. Does capital structure affect the overall cost of capital?

A. Yes. Capital structure will affect the value of a firm and, therefore, its cost of capital, to the extent it affects the expected level of cash flows that accrue to third parties (i.e., other than debt and stock holders). Employing debt as a source of

[1] Order, Docket No. 95-0076, December 20, 1995, p. 51.

capital reduces a company's income taxes,[2] thereby reducing the cost of capital; however, as reliance on debt as a source of capital increases, so does the probability of bankruptcy. As bankruptcy becomes more probable, expected payments to attorneys, trustees, accountants and other third parties increase. Simultaneously, the expected value of the income tax shield provided by debt financing declines. Beyond a certain point, a growing dependence on debt as a source of funds increases the overall cost of capital. Therefore, the Commission should not determine the overall rate of return from a utility's actual capital structure if it determines that capital structure adversely affects the overall cost of capital.

An optimal capital structure would minimize the cost of capital and maintain a utility's financial integrity. Unfortunately, determining whether a capital structure is optimal remains problematic because (1) the cost of capital is a continuous function of the capital structure, rendering its precise measurement along each segment of the range of possible capital structures problematic; (2) the optimal capital structure is a function of operating risk, which is dynamic; and (3) the relative costs of the different types of capital vary with dynamic market conditions. Consequently, one should determine whether the capital structure is consistent with the financial strength necessary to access the capital markets

[2] The tax advantage debt has over equity at the corporate level is partially offset at the individual investor level. Debt investors receive returns largely in the form of current income (i.e., interest). In contrast, equity investors receive returns in the form of both current income (i.e., dividends) and capital appreciation (i.e., capital gains). Taxes on corporate dividends and capital gains are lower than taxes on corporate interest income because corporate dividend and capital gains tax rates are lower and taxes on capital gains are deferred until realized.

under most, if not all, conditions, and if so, whether the cost of that financial strength is reasonable.

Towards that end, I compared the Company's average 2004 capital structure to industry standards. Standard & Poor's ("S&P") categorizes debt securities on the basis of the risk that a company will default on its interest or principal payment obligations. The resulting credit rating reflects both the operating and financial risks of a utility.[3] The mean total debt ratio of water utilities that have an S&P 'A' credit rating equals 55.13%.[4] The mean common equity ratio for S&P A-rated water utilities equals 44.00%. The above ratios are shown in Table 1 below for comparative purposes.

Table 1:
Capital Structure Ratios

	A-rated Water Utilities		S&P Benchmark for an 'A' Credit Rating and Business Profile of 3	CIWC Average 2004
	Mean	Standard Deviation	Range	
Total Debt Ratio	55.13%	2.35%	47.5% - 53.0%	48.59%
Equity Ratio	44.00%	2.62%		51.06%

CIWC's average 2004, total debt and equity ratios are reasonably close to the mean total debt and equity ratios for S&P A-rated water utilities. According to S&P, an obligor rated 'A' has a strong capacity to meet its financial commitments

[3] *Standard & Poor's Utility Financial Statistics*, June 1999, p. 3; Standard & Poor's Utilities Rating Service: Industry Commentary, May 20, 1996, p. 1.
[4] *S& P Utility Compustat*.

but to a lesser degree than higher-rated obligors.[5] The above suggests that the average 2004 capital structure for CIWC as presented by Staff on Schedule 3.01 is commensurate with a strong but not excessive degree of financial strength.

Q. S&P currently does not rate CIWC. Why did you compare CIWC's capital ratios to water utilities with an A credit rating?

A. S&P publishes targets for the following four financial ratios (collectively, the "Benchmark Ratios") that it uses in its analysis of investor-owned utilities: (1) funds from operations ("FFO") to total debt; (2) FFO interest coverage; (3) pre-tax interest coverage; and (4) total debt to total capital.[6] The Benchmark Ratios measure financial risk. The financial targets vary with the business profile score. The S&P published targets for utilities with business profile scores of 3 indicate that CIWC's financial strength is consistent with an A+ corporate credit rating. Table 2 presents CIWC and its parent, PSC's, financial ratios for the 2000-2002 period.

[5] *Standard & Poor's Utility Financial Statistics*, June 1999, p. 4.
[6] Standard & Poor's, "Utility Financial Targets are Revised," June 18, 1999.

Table 2:
S&P Utility Benchmark Credit Ratio Analysis

	CIWC	PSC	S&P Target Range	S&P Target Range
Financial Ratio	3-year average	3-year average	AA-rated utilities with a business profile score of 3	A-rated utilities with a business profile score of 3
FFO to Total Debt	21.44%	17.50%	26.0% – 31.5%	20.0% – 26.0%
FFO Interest Coverage	4.0x	3.6x	3.9x – 4.5x	3.1x – 3.9x
Pretax Interest Coverage	2.9x	3.4x	3.4x – 4.0x	2.8x – 3.4x
Total Debt to Total Capital	51.8%	58.1%	42.0% – 47.5%	47.5% – 53.0%

The ratios indicate that CIWC's financial strength is as strong if not stronger than its ultimate parent PSC, which Standard and Poor's rates A+.[7]

Q. Why did you compare CIWC's Benchmark Ratio values to the ranges S&P established for the business profile score of 3?

A. A firm's market-required return on common equity is a function of its operating and financial risks. S&P business profile scores reflect the operating risk of a utility. S&P focuses on industry characteristics as well as the company's competitive position and management. A utility's business profile is evaluated on a scale of one to ten. A rating of one denotes below average business risk, while

[7] Standard and Poor's Ratings Direct, "CreditStats: Water Utilities," February 12, 2003, p. 1.

a rating of ten denotes above average business risk.[8] I imputed an S&P business profile score for the Company, since it does not have one. I began with eleven water companies with S&P business profile scores listed in S&P *Utilities & Perspectives*. Of these eleven water utilities, eight are assigned a business profile score of 3 and three are assigned a business profile score of 2.[9] The average business profile score of the eleven water utilities is 2.73. From that average business profile score, I concluded that a business profile score of 3 would be a reasonable estimate for the Company.

Cost of Short-term Debt

Q. What is CIWC's cost of short-term debt?

A. CIWC issues short-term debt in the form of bank loans. The interest rate on those loans equals the thirty to 360-day London Interbank Offered Rate ("LIBOR") plus sixty-five basis points.[10] For the cost of short-term debt, I added 65 basis points to the August 11, 2003 three month LIBOR rate, 1.13%, for a total cost of 1.78%.[11]

---

[8] Standard & Poor's, *Corporate Ratings Criteria 2002,* www.standardandpoors.com/ratings, p. 17.
[9] Standard & Poor's, *Utilities & Perspectives,* August 11, 2003, pp. 15-16.
[10] Company's Schedule D-2, p. 1.
[11] The Wall Street Journal, August 11, 2003, p. C11.

Cost of Long-Term Debt

Q. What is the embedded cost of long-term debt for CIWC?

A. As shown on Schedule 3.03, the average embedded cost of long-term debt for 2004 equals 7.90%, which agrees with the Company's estimate.

Cost of Preferred Stock

Q. What is the embedded cost of preferred stock for CIWC?

A. As shown on Schedule 3.04, the average embedded cost of preferred stock for 2004 equals 5.48%, which agrees with the Company's estimate.

Cost of Common Equity

Q. How did you measure the investor-required rate of return on common equity for CIWC?

A. I measured the investor-required rate of return on common equity for CIWC with discounted cash flow ("DCF") and risk premium models. Since CIWC does not have market-traded common stock, DCF and risk premium models cannot be

applied directly to CIWC; therefore, I applied both models to water utility and public utility samples.[12]

Sample Selection

Q. How did you select your water sample?

A. I selected my water sample based on two criteria. First, I began with a list of all domestic corporations assigned an industry number of 4941 (i.e., water utilities) from *Standard & Poor's Utility Compustat*. Second, I removed any company that had neither Zacks Investment Research ("Zacks") nor Institutional Brokers Estimate System ("IBES") long-term growth rates. The remaining companies, American States Water Company; Artesian Resources; California Water Service Group; Middlesex Water Company; Philadelphia Suburban Corporation; Southwest Water Company; and York Water Company, compose my sample.

Q. How did you select a utility sample comparable in risk to CIWC?

A. To form the utility sample, I began with a list of all domestic publicly traded corporations assigned an industry number of 4911, 4922, 4923, 4924, 4931, or 4932 in the S&P *Utility Compustat II* database that matched CIWC's implied business profile score of 3. Second, I removed any company that had an S&P debt rating other than AA, AA-, A+, A, or A-. Next, I removed any company that

[12] Hereafter referred to as *water sample* and *utility sample*, respectively.

lacked either Zacks or IBES growth rates. Finally, I eliminated any company that was in the process of being acquired by another company. The remaining companies, AGL Resources Inc.; Consolidated Edison Inc.; Laclede Gas Co.; Nicor Inc.; Northwest Natural Gas Co.; Nstar; Piedmont Natural Gas Co; and WGL Holdings Inc., compose my utility sample.

DCF Analysis

Q. Please describe DCF analysis.

A. For a utility to attract common equity capital, it must provide a rate of return on common equity sufficient to meet investor requirements. DCF analysis establishes a rate of return directly from investor requirements. A comprehensive analysis of a utility's operating and financial risks becomes unnecessary in DCF analysis since the market price of a utility's stock already embodies the market consensus of those risks.

According to DCF theory, a security price equals the present value of the cash flow investors expect it to generate. Specifically, the market value of common stock equals the cumulative value of the expected stream of future dividends after each is discounted by the investor-required rate of return.

Q. Please describe the DCF model with which you measured the investor-required rate of return on common equity.

A. As it applies to common stocks, DCF analysis is generally employed to determine appropriate stock prices given a specified discount rate. Since a DCF model incorporates time-sensitive valuation factors, it must correctly reflect the timing of the dividend payments that stock prices embody. As such, incorporating stock prices that the financial market sets on the basis of quarterly dividend payments into a model that ignores the time value of quarterly cash flows constitutes a misapplication of DCF analysis.

The companies in both samples pay dividends quarterly; therefore, I applied a constant-growth DCF model that measures the annual required rate of return on common equity as follows:

$$k = \frac{\sum_{q=1}^{4} D_{1,q}\,(1+k)^{1-[x+0.25\,(q-1)]}}{P} + g.$$

where:
- P ≡ the current stock price;
- $D_{1,q}$ ≡ the next dividend paid at the end of quarter q, where q = 1 to 4;
- k ≡ the cost of common equity;
- x ≡ the elapsed time between the stock observation and first dividend payment dates, in years; and
- g ≡ the expected dividend growth rate.

That model assumes dividends will grow at a constant rate, and the market value of common stock (i.e., stock price) equals the sum of the discounted value of each dividend.

Q. How did you estimate the growth rate parameter?

A. Determining the market-required rate of return with the DCF methodology requires a growth rate that reflects the expectations of investors. Although the current market price reflects aggregate investor growth expectations, market-consensus expected growth rates cannot be measured directly. Therefore, I measured market-consensus expected growth rates indirectly with security analysts' growth rate forecasts.

Q. Please describe the published growth rate forecasts used for the firms in your samples.

A. I examined analysts' projected earnings growth rates published on July 16, 2003 by IBES and August 11, 2003 by Zacks. IBES and Zacks summarize the earnings growth expectations of financial analysts employed by the research departments of investment brokerage firms. Both provide forward-looking, expectational estimates of earnings growth. The growth rate estimates from IBES and Zacks for each firm in my samples are presented on Schedule 3.05. For those companies with growth rate estimates from both sources, I averaged the IBES and Zacks growth rates.

Q. How did you measure the stock price?

A. A current stock price reflects all information that is available and relevant to the market; thus, it represents the market's assessment of the common stock's current value. I measured each company's current stock price with its closing market price from August 11, 2003. Those stock prices appear on Schedule 3.06.

Since stock prices reflect both the market's expectation of the cash flows the securities will produce and the rate at which those cash flows are discounted, an observed change in the market price does not necessarily indicate a change in the required rate of return on common equity. Price changes may reflect an investor re-evaluation of the expected dividend growth rate. In addition, stock prices change with the approach of dividend payment dates. Consequently, when estimating the required return on common equity with the DCF model, one should measure the expected dividend yield and the corresponding expected growth rate concurrently.

Q. Please explain the significance of the column titled "Next Dividend Payment Date" shown on Schedule 3.06.

A. Estimating year-end dividend values requires measuring the length of time between each dividend payment date and the first anniversary of the stock observation date. For the first dividend payment, that length of time is measured

from the "Next Dividend Payment Date." Subsequent dividend payments occur in quarterly intervals.

Q. How did you estimate the next four expected quarterly dividends?

A. Most utilities declare and pay the same dividend per share for four consecutive quarters before adjusting the rate. Consequently, I assumed the dividend rate will adjust during the same quarter it changed during the preceding four quarters. If the utility did not change its dividend during the previous four quarters, I assumed the rate would change during the next quarter. For the quarter in which the dividend rate is expected to adjust, if the utility has already declared a new dividend rate then the expected dividend rate equals that newly declared dividend rate. Otherwise, the expected dividend rate equals the sum of one plus the average expected growth rate $(1+g)$ times the current dividend rate $D_{0,q}$. Schedule 3.06 presents the current quarterly dividends. Schedule 3.07 presents the expected quarterly dividends.

Q. Based on your DCF analysis, what is the estimated required rate of return on common equity for the water sample and the utility sample?

A. The DCF analysis estimates the required rate of return on common equity is 9.74% for the water sample and 9.75% for the utility sample, as shown on Schedule 3.08. Those estimates are derived from the growth rates from

Schedule 3.05, the stock price and dividend payment dates from Schedule 3.06, and the expected quarterly dividends from Schedule 3.07.

Risk Premium Analysis

Q. Please describe the risk premium model.

A. The risk premium model is based on the theory that the market-required rate of return for a given security equals the risk-free rate of return plus a risk premium associated with that security. A risk premium represents the additional return investors expect in exchange for assuming the risk inherent in an investment. Mathematically, a risk premium equals the difference between the expected rate of return on a risk factor and the risk-free rate. If the risk of a security is measured relative to a portfolio, then multiplying that relative measure of risk and the portfolio's risk premium produces a security-specific risk premium for that risk factor.

The risk premium methodology is consistent with the theory that investors are risk-averse. That is, investors require higher returns to accept greater exposure to risk. Thus, if investors had an opportunity to purchase one of two securities with equal expected returns, they would purchase the security with less risk. Conversely, if investors had an opportunity to purchase one of two securities with equal risk, they would purchase the security with the higher expected return. In

equilibrium, two securities with equal quantities of risk have equal required rates of return.

The Capital Asset Pricing Model ("CAPM") is a one-factor risk premium model that mathematically depicts the relationship between risk and return as:

$$R_j = R_f + \beta_j \times (R_m - R_f)$$

where: R_j $\equiv$ the required rate of return for security *j*;

R_f $\equiv$ the risk-free rate;

R_m $\equiv$ the expected rate of return for the market portfolio; and

β_j $\equiv$ the measure of market risk for security *j*.

In the CAPM the risk factor is market risk, which is defined as risk that cannot be eliminated through portfolio diversification. To implement the CAPM, one must estimate the risk-free rate of return, the expected rate of return on the market portfolio, and a security or portfolio-specific measure of market risk.

Q. How did you estimate the risk-free rate of return?

A. I examined the suitability of the yields on three-month U.S. Treasury bills and thirty-year U.S. Treasury bonds as estimates of the risk-free rate of return.

Q. Why did you examine the yields on U.S. Treasury bills and bonds as measures of the risk-free rate?

A. The proxy for the nominal risk-free rate should contain no risk premium and reflect similar inflation and real risk-free rate expectations to the security being analyzed through the risk premium methodology.[13] The yields of fixed income securities include premiums for default and interest rate risk. Default risk pertains to the possibility of default on principal or interest payments. Securities of the United States Treasury are virtually free of default risk by virtue of the federal government's fiscal and monetary authority. Interest rate risk pertains to the effect of unexpected interest rate fluctuations on the value of securities.

Since common equity theoretically has an infinite life, its market-required rate of return reflects the inflation and real risk-free rates anticipated to prevail over the long run. U.S. Treasury bonds, the longest term treasury securities, were issued with terms to maturity of thirty years; U.S. Treasury notes are issued with terms to maturity ranging from two to ten years; U.S. Treasury bills are issued with terms to maturity ranging from four weeks to six months. Therefore, U.S. Treasury bonds are more likely to incorporate within their yields the inflation and real risk-free rate expectations that drive, in part, the prices of common stocks than either U.S. Treasury notes or Treasury bills.

However, due to relatively long terms to maturity, U.S. Treasury bond yields also contain an interest rate risk premium that diminishes their usefulness as measures of the risk-free rate. U.S. Treasury bill yields contain a smaller

[13] Real risk-free rate and inflation expectations comprise the non-risk related portion of a security's rate of return.

premium for interest rate risk. Thus, in terms of interest rate risk, U.S. Treasury bill yields more accurately measure the risk-free rate.

Q. Given that the inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bonds and the prices of common stocks are similar, does it necessarily follow that the inflation and real risk-free rate expectations that are reflected in the yields on U.S. Treasury bills and the prices of common stocks are dissimilar?

A. No. To the contrary, short and long-term inflation and real risk-free rate expectations, including those that are reflected in the yields on U.S. Treasury bills, U.S. Treasury bonds, and the prices of common stocks, should equal over time. Any other assumption implausibly implies that the real risk-free rate and inflation is expected to systematically and continuously rise or fall.

Although expectations for short and long-term real risk-free rates and inflation should equal over time, in finite time periods, short and long-term expectations may differ. Short-term interest rates tend to be more volatile than long-term interest rates.[14] Consequently, over time U.S. Treasury bill yields are less biased (i.e., more accurate) but less reliable (i.e., more volatile) estimators of the long-term risk-free rate than U.S. Treasury bond yields. In comparison, U.S. Treasury

[14] Fabozzi and Pollack, ed., *The Handbook of Fixed Income Securities*, Fourth Edition, Irwin, p. 789.

bond yields are more biased (i.e., less accurate) but more reliable (i.e., less volatile) estimators of the long-term risk-free rate. Therefore, an estimator of the long-term nominal risk-free rate should not be chosen mechanistically. Rather, the similarity in current short and long-term nominal risk-free rates should be evaluated. If those risk-free rates are similar, then U.S. Treasury bill yields should be used to measure the long-term nominal risk-free rate. If not, some other proxy or combination of proxies should be found.

Q. What is the current yield on three-month U.S. Treasury bills and the current estimated yield on thirty-year U. S. Treasury bonds?

A. Three-month U.S. Treasury bills are currently yielding 0.96%. The estimated yield for Treasury bonds equals 5.50%.[15] Both estimates are derived from quotes for August 11, 2003.[16] Schedule 3.09 presents the published quotes and effective yields.

Q. Of the U.S. Treasury bill and bond yields, which is currently a better proxy for the long-term risk-free rate?

[15] Since the suspension of the 30-year U.S. Treasury bond, the U.S. Treasury publishes a Long-Term Average Rate ("LTAR"), which represents the arithmetic average of the bid yields on all outstanding fixed-coupon securities with 25 years or more remaining to maturity. Additionally, the U.S. Treasury publishes daily linear extrapolation factors that can be added to the LTAR to estimate a 30-year rate. www.treas.gov/offices/domestic-finance/debt-management/interest-rate/ltcompositeindex.html

[16] The Federal Reserve Board, *Federal Reserve Statistical Release: Selected Interest Rates, H.15 Daily Update*, http://www.federalreserve.gov/releases/H15/update/, August 12, 2003.

A. In terms of the gross domestic product ("GDP") price index, the Energy Information Administration ("EIA") forecasts the inflation rate will average 2.5% annually during the 2003-2025 period.[17] In terms of the Consumer Price Index ("CPI"), the EIA forecasts the inflation rate will average 2.9% annually during the 2003-2025 period. In comparison, Global Insight forecasts that the GDP price inflation will average 2.8% annually during the 2003-2028 period.[18] In terms of the CPI, the *Survey of Professional Forecasters* ("*Survey*") forecasts the inflation rate will average 2.5% during the next ten years.[19] In terms of real GDP growth, EIA forecasts the real risk-free rate will average 3.1% during the 2003-2025 period;[20] Global Insight forecasts the real risk-free rate will average 3.0% during the 2003-2028 period;[21] and the *Survey* forecasts the real risk-free rate will average 3.2% during the next ten years.[22] Those forecasts imply a long-term, nominal risk-free rate between 5.7% and 6.0%.[23] Therefore, EIA, Global Insight, and *Survey* forecasts of inflation and real GDP growth expectations suggest that,

---

17 Energy Information Administration, *EIA 2003 Long-Term Forecast*, Table 20, Macroeconomic Indicators.

18 Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1, Winter 2003.

19 *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/survq203.html, May 20, 2003. The *Survey* aggregates the forecasts of approximately thirty forecasters.

20 Energy Information Administration, *EIA 2003 Long-Term Forecast*, Table 20, Macroeconomic Indicators.

21 Global Insight, "The U.S. Economy: The 25 Year Focus," Table 1, Winter 2003.

22 *Survey of Professional Forecasters*, Federal Reserve Bank of Philadelphia, www.phil.frb.org/files/spf/survq103.html, February 24, 2003.

23 Nominal interest rates are calculated as follows:

$$r = (1 + R) \times (1 + i) - 1.$$

where $r \equiv$ nominal interest rate;
$R \equiv$ real interest rate; and
$i \equiv$ inflation rate.

currently, the U.S. Treasury bond yield more closely approximates the long-term risk-free rate. It should be noted, however, the U.S. Treasury bond yield is an upwardly biased estimator of the long-term risk-free rate due to the inclusion of an interest rate risk premium associated with its relatively long term to maturity.[24]

Q. Please explain why the real risk-free rate and the GDP growth rate should be similar.

A. Risk-free securities provide a rate of return sufficient to compensate investors for the time value of money, which is a function of production opportunities, time preferences for consumption, and inflation.[25] The real risk-free rate excludes the premium for inflation. The real GDP growth rate measures output of goods and services without reflecting inflation and, as such, also reflects both production opportunities and consumers' consumption preferences. Therefore, both the real GDP growth rate and the real risk-free rate of return should be similar since both are a function of production opportunities and consumption preferences without the effects of either a risk premium or an inflation premium.

Q. How was the expected rate of return on the market portfolio estimated?

A. The expected rate of return on the market was estimated by conducting a DCF

[24] For example, the current long-term government bond yield of 5.48% and the average historic realized horizon premium of 1.5% during the last 32 years (Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation, 2003 Yearbook*, p. 177) imply a risk-free rate of approximately 3.9%.

analysis on the firms comprising the S&P 500 Index ("S&P 500") as of July 1, 2003. That analysis used dividend information reported in the July 2003 edition of *Standard & Poor's Security Owner's Stock Guide* and July 1, 2003 closing market prices reported by the Chicago Board of Options Exchange. Growth rate estimates were obtained from the June 19, 2003 edition of *IBES Monthly Summary Data* and August 7, 2003, Zacks reports. Firms not paying a dividend as of July 1, 2003, or for which neither IBES nor Zacks growth rates were available, were eliminated from the analysis. The resulting company-specific estimates of the expected rate of return on common equity were then weighted using July 1, 2003 market value data from the Chicago Board of Options Exchange. The estimated weighted average expected rate of return for the remaining 359 firms, composing 83.76% of the market capitalization of the S&P 500, equals 13.66%.

Q. How did you measure market risk on a security-specific basis?

A. Beta measures risk in a portfolio context. When multiplied by the market risk premium, a security's beta produces a market risk premium specific to that security. I developed two distinct sample average betas for each of my samples, one based on the Value Line methodology ("Value Line beta") and the other based on the Merrill Lynch methodology ("Regression beta").[26]

[25] Brigham and Houston, Fundamentals of Financial Management, 8th edition.
[26] The Regression beta methodology is the same as the Merrill Lynch methodology except the

When available, I used published Value Line beta estimates for each company in each sample.[27] For those companies that did not have published Value Line beta estimates, I calculated beta estimates using the Value Line methodology.[28] Value Line estimates beta for a security with the following model using an ordinary least-squares technique:[29]

$$R_{j,t} = a_j + \beta_j \times R_{m,t} + e_{j,t}$$

where $R_{j,t}$ ≡ the return on security j in period t;

$R_{m,t}$ ≡ the return on the market portfolio in period t;

a_j ≡ the intercept term for security j;

β_j ≡ beta, the measure of market risk for security j; and

$e_{j,t}$ ≡ the residual term in period t for security j.

A beta can be calculated for firms with market-traded common stock. Value Line calculates its betas in two steps. First, the returns of each company are regressed against the returns of the New York Stock Exchange Composite Index ("NYSE Index") to estimate a raw beta. The regression analysis employs 260 weekly observations of stock return data. Then, an adjusted beta is estimated through the following equation:

Regression beta methodology substitutes (1) total excess return data for the total price change data that the Merrill Lynch methodology uses and (2) the NYSE Composite Index for the S&P500 Index as a proxy for the market return. The former substitution does not significantly affect the beta estimate; however, using the NYSE Composite Index as a proxy for the market return produced higher utility betas than using the S&P500 Index.

[27] The Value Line Investment Survey, "Summary and Index," August 8, 2003, pp. 1-17.

[28] The Value Line service to which the Commission subscribes does not provide beta estimates for Artesian Resources, Middlesex Water, Southwest Water, or York Water.

[29] Statman, Meir, "Betas Compared: Merrill Lynch vs. Value Line", *The Journal of Portfolio Management*, Winter 1981.

$$\beta_{adjusted} = 0.35 + 0.67 \times \beta_{raw}.$$

The regression analysis estimate of beta for a security or portfolio of securities is estimated with the following model using an ordinary least-squares technique:

$$R_{j,t} - R_{f,t} = a_j + \beta_j \times (R_{m,t} - R_{f,t}) + e_{j,t}$$

where $R_{j,t}$ ≡ the return on security j in period t;

$R_{f,t}$ ≡ the risk-free rate of return in period t;

$R_{m,t}$ ≡ the return on the market portfolio in period t;

a_j ≡ the intercept term for security j;

β_j ≡ beta, the measure of market risk for security j; and

$e_{j,t}$ ≡ the residual term in period t for security j.

Next, a beta estimate for both samples was calculated in three steps using regression analysis. First, the U.S. Treasury bill return is subtracted from the average percentage change in the two samples' stock prices and the percentage change in the NYSE Index to estimate each portfolio's return in excess of the risk-free rate. Second, the excess returns of each of the two samples are regressed against the excess returns of the NYSE Index to estimate a raw beta. The regression analysis employs sixty monthly observations of stock and U.S. Treasury bill return data. Third, the beta is adjusted through the following equation:

$$\beta_{adjusted} = 0.33743 + 0.66257 \times \beta_{raw}.$$

Q. Why do you use an adjusted beta estimate?

A. I use an adjusted beta estimate for two reasons. First, betas tend to regress towards the market mean value of 1.0 over time; therefore, the adjustment represents an attempt to estimate a forward-looking beta. Second, empirical tests of the CAPM suggest that the linear relationship between risk, as measured by raw beta, and return may be flatter than the CAPM predicts. That is, securities with raw betas less than one tend to realize higher returns than the CAPM predicts. Conversely, securities with raw betas greater than one tend to realize lower returns than the CAPM predicts. Adjusting the raw beta estimate towards the market mean value of 1.0 compensates for the observed flatness in the linear relationship between risk and return.[30] Securities with betas less than one are adjusted upwards thereby increasing the predicted required rate of return towards observed realized rates of return. Conversely, securities with betas greater than one are adjusted downwards thereby decreasing the predicted rate of return towards observed realized rates of return.

Q. What are the beta estimates for the water sample and the utility sample?

A. The Value Line beta estimates average 0.57 for the water sample and 0.67 for the utility sample. The Regression beta estimates are 0.43 and 0.52, respectively. The average of the Value Line and Regression beta estimates equals 0.50 for the water sample and 0.595 for the utility sample.

[30] Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, pp. 375-376.

Q. What required rate of return on common equity does the risk premium model estimate for the two samples?

A. The risk premium model estimates a required rate of return on common equity of 9.58% for the water sample and 10.36% for the utility sample. The computation of those estimates appears on Schedule 3.09.

Cost of Equity Recommendation

Q. Based on your entire analysis, what is your estimate of the required rate of return on the common equity for CIWC?

A. A thorough analysis of the required rate of return on common equity requires both the application of financial models and the analyst's informed judgment. An estimate of the required rate of return on common equity based solely on judgment is inappropriate. Nevertheless, because techniques to measure the required rate of return on common equity necessarily employ proxies for investor expectations, judgment remains necessary to evaluate the results of such analyses. Along with DCF and risk premium analyses, I have considered the observable 6.17% rate of return the market currently requires on A-rated utility

long-term debt.[31] Based on my analysis, in my judgment, the investor-required rate of return on common equity for CIWC is 9.86%.

Q. Please summarize how you arrived at the investor-required rate of return on common equity for CIWC.

A. The models from which the individual company estimates were derived are correctly specified and thus contain no source of bias. Moreover, I am unaware of bias in any of my proxies for investor expectations.[32] Consequently, estimates for a sample as a whole are subject to less measurement error than individual company estimates. I estimated the investor-required rate of return on common equity by: 1) averaging the DCF-derived estimates of the required rate of return on common equity, or 9.75%, 2) averaging the risk premium-derived estimates of the required rate of return on common equity, or 9.97%, and 3) taking the midpoint of the DCF and risk premium derived estimates, or 9.86%.

Overall Cost of Capital Recommendation

Q. What is the overall cost of capital for CIWC in this proceeding?

[31] Selection and Opinion, Value Line, August 15, 2003, p. 9.
[32] Except as discussed above in regard to U.S. Treasury bond yields as proxies for the long-term risk-free rate.

A. As shown on Schedule 3.01, the overall cost of capital estimate for CIWC is 8.87%. My cost of capital recommendation of 8.87% incorporates a cost of common equity of 9.86%.

Response to Ms. Ahern

Q. Please evaluate Ms. Ahern's analysis of CIWC's cost of common equity.

A. Ms. Ahern's analysis contains several errors that lead her to over-estimate CIWC's cost of common equity. Critical errors occur in, or are the result of, her Discounted Cash Flow ("DCF"), Capital Asset Pricing Model ("CAPM"), Risk Premium ("RPM"), and Comparable Earnings ("CEM") analyses. The most significant flaws in Ms. Ahern's analysis of CIWC's cost of common equity are the following:

1. Ms. Ahern's utility sample is riskier than CIWC.

2. Ms. Ahern's use of historical data in each of her models is problematic.

3. The growth rate Ms. Ahern used in her DCF model is questionable.

4. Ms. Ahern's CAPM analysis suffers from a number of errors, the most critical of which are her flawed derivation of the overall market return ("R_m") and an improper use of adjusted betas in her "empirical" CAPM model.

5. Ms. Ahern's Risk Premium Model ("RPM") is flawed on several levels.

6. Ms. Ahern's Comparable Earnings Model ("CEM") is theoretically and empirically invalid.

7. Ms. Ahern's inclusion of size-based risk premiums in her cost of equity is unwarranted.

Utility Sample

Q. How did you conclude that Ms. Ahern's utility sample is riskier than CIWC?

A. Ms. Ahern presents the credit ratings and business profiles of the companies that comprise her utility sample on page 2 of CIWC Exhibit No. 3, Schedule 13. Since Ms Ahern failed to provide supporting documents for the credit ratings listed on this page, I was unable to check the accuracy of the Moody's bond rating.[33] However, I found numerous errors in the Standard and Poor's data Ms. Ahern presented. Specifically, Ms. Ahern erred when she used the ratings of sample company subsidiaries even when those sample companies had published S&P credit ratings and business position scores. Correcting this reveals that the average credit rating and business position of her utility sample is less favorable from a risk standpoint than she presented. Table 3 below lists the corrections to Ms. Ahern's S&P credit ratings and business position scores.

Table 3: S&P Credit Ratings and Business Positions				
	per CIWC Exhibit No. 3 Schedule 13 page 2		Corrected	
Company	S&P Credit Rating	S&P Business Position	S&P Credit Rating	S&P Business Position
AGL Resources, Inc.		2		3
Cleco Corporation	BBB+	5	BBB	6
DPL Inc.		4		6
Middlesex Water Company	A+		A	
Philadelphia Suburban Corp.	AA-		A+	
Public Service Enterprise Group, Inc.	A-	3	BBB	6
Southern Company	A+		A	
TECO Energy, Inc.		4		5
WPS Resources Corporation	AA-	4	A	5

The Ahern utility sample's corrected average credit rating and business position are A- and 4.1, respectively. In comparison to CIWC's implied credit rating of A+ and business position of 3, the S&P credit rating and business position scores indicate that the Ahern utility sample has higher financial and business risk.

As discussed previously, two securities with equal quantities of risk have equal required rates of return, but investors require higher returns to accept greater exposure to risk. Therefore, to accurately estimate a company's cost of equity through a proxy, that proxy must either have a similar risk level to the target company, or an adjustment to the proxy's cost of common equity is necessary.

[33] Ms. Ahern was asked to provide the information in Staff data request SK 1.14. Ms Ahern failed to provide any documents supporting the Moody's credit ratings she presented in Schedule 13 on page 2.

Historical Data

Q. Why is Ms. Ahern's use of historical data in her DCF, CAPM, RPM, and CEM models improper?

A. The use of historical data is problematic. First, historical data improperly favors outdated information that the market no longer considers relevant over the most-recently available information. Second, historical data reflects conditions that may not continue in the future. In other words, use of average historical data wrongly implies that securities data will revert to a mean. To the contrary, security return movements approximate a random walk, which suggests no tendency of mean reversion.[34] That is, in a random walk, the "future steps or directions cannot be predicted on the basis of past actions."[35] Finally, even if securities data were mean reverting, there is no method for determining the true value of that mean. Consequently, sample means, which depend upon the measurement period used, are substituted. Thus, any measurement period chosen is arbitrary, rendering the results uninformative.

Q. What historical data did Ms. Ahern use in her cost of equity analyses?

A. Ms. Ahern used historical data, in part, to estimate the growth rates and dividend yields in her DCF analysis, the spread between the AAA-rated corporate bond

[34] Burton G. Malkiel, *A Random Walk Down Wall Street*, Fourth Edition, Norton, 1985, pp. 132 and 146.
[35] Id., at 16, *emphasis added*.

yields and A-rated utility bond yields and the equity risk premium in her RPM analysis, the market equity risk premium in her CAPM analysis, and the return on book common equity for the two groups of non-price regulated proxy companies in her CEM analysis.

Q. Please provide an example of how the use of historical data can distort cost of equity analyses.

First, consider Ms. Ahern's use of historical data[36] in determining the dividend yield (dividend ÷ stock price) in her DCF model. Since stock prices reflect all current information, only the most recent stock price can reflect the most recently available information. Historical stock prices must include observations that cannot reflect the most current information available to the market. For example, if the actual earnings for a company were much higher than anticipated, the market would react to that news and bid up its stock price. Consequently, the pre-earnings announcement stock prices would reflect obsolete information and understate the value of that company's stock.

Ms. Ahern claims that she used historical data to estimate the dividend yield because it "normalizes the recent volatility of the stock market which she believes is not representative [of] the period of time in which rates set in this docket will be

[36] Ms. Ahern used an average of the spot, 3 month, 6 month, and 12 month yields (CIWC Exhibit No. 3, p. 31).

in effect."[37] While it is true that measurement error is a problem inherent in cost of common equity analysis and should be reduced whenever possible, introducing old stock prices into an analysis simply substitutes one alleged source of measurement error, volatile stock prices, for another, irrelevant stock prices. Stock prices can be influenced by temporary imbalances in supply and demand; however, any distortions such imbalances might have on the measured cost of common equity can be reduced through the use of samples, a technique which Ms. Ahern already applies.

The CAPM calls for an estimate of the required rate of return on the market portfolio. Ms. Ahern estimates the required rate of return on the market using, in part, historical earned rates of return.[38] As proxies for current required rates of return, historical earned returns possess several shortcomings. First, the returns an investment generates are unlikely to have equaled investor return requirements due to unpredictable economic, industry-related, or company-specific events. Second, even if an investment's return equaled investor requirements in a given period, both the price of, and the investment's sensitivity to, each source of risk changes over time. Consequently, the past relationship between two investments, such as common equity and debt, is unlikely to remain constant. Third, the magnitude of the historical risk premium depends upon the measurement period used. Unfortunately, no widely-accepted guidelines exist for determining the appropriate measurement period. Thus, historical earned

[37] Company response to Staff Data Request SK 1.07.

rates of return will accurately estimate the required rate of return only through random chance.

Q. Has the Commission previously ruled on the use of historical data in determining a company's cost of common equity before?

A. Yes. In Docket No. 92-0357, a rate proceeding for Iowa-Illinois Gas and Electric Company, the Commission Order stated, "[t]he Commission notes that the investor-required return on common equity is a forward-looking concept. Mr. Benore [the company witness], in many instances, inappropriately utilized historical data to determine the Company's cost of equity."[39] Similarly, in Docket No. 95-0076, a rate proceeding for Consumers Illinois Water Company, the Commission Order stated, "[t]he Commission also concludes that Staff's criticism of Dr. Phillips' use of two-month average historical stock prices and historical growth rates in his traditional DCF analysis, and historical risk premiums in his risk premium analysis are valid. Historical data is inappropriate in determining a forward-looking cost of equity because it contains information that may no longer be relevant to investors."[40]

DCF Model

Q. How did Ms. Ahern derive the growth rate used in her DCF model?

[38] CIWC Exhibit No. 3, p. 50, lines 18-20.

A. Ms. Ahern begins with seven types of growth rate estimates from three different sources. Some are based on dividends per share ("DPS"), others on earnings per share ("EPS"); some are historical, others projected; some are from Value Line, others from Thomas FN/First Call, and still others she derived herself.[41] She used different combinations of those growth rates to derive two average growth rate estimates ("Composite Growth Estimates"). Her final DCF-based cost of equity estimate was the average of the DCF results obtained from using the Composite Growth Estimates. Ms. Ahern's first Composite Growth Estimate is the average of a) the mean of the highest and lowest growth estimates and b) the mean of all seven growth estimates. The second Composite Growth Estimate comprises the average of the Value Line and Thomas FN/First Call forecasts of EPS growth for each company in her two samples.[42]

Q. Explain why Ms. Ahern's growth rate estimation procedure is questionable.

A. In addition to the shortcomings of using historical data discussed previously, Ms. Ahern's growth rate estimates reflect two major problems. First, missing data undermines the integrity of Ms. Ahern's growth rate. Second, Ms Ahern introduces circularity into the estimate of return on common equity by the inclusion of the "BR+SV" growth estimate.

---

[39] Order, Docket No. 92-0357, July 21, 1993, p. 66.
[40] Order, Docket No. 95-0076, December 20, 1995, p. 70.
[41] CIWC Exhibit No. 3, Schedule 12, p. 1, columns 1-8.
[42] CIWC Exhibit No. 3, Schedule 12, p. 1, Column 7.

Ms. Ahern's averages of all growth rate types for each proxy group are uninformative because they include the Value Line Projected 2000-2002 to 2006-2008 Growth Rates for EPS and DPS, both of which suffer from missing data. For both proxy groups, the average Value Line Projected 2000-2002 to 2006-2008 EPS Growth Rates of 8.3% and 6.2% for the Water Group and Utility Group respectively, represent the upper extreme of the range of estimates she employs (2.8-8.3% and 2.1-6.8%).[43] Unfortunately, Value Line estimates are available for only three of the seven Water Group companies. That is, the range of estimates from which Ms. Ahern has employed the high-end reflects the growth rates of only three of the seven companies in her water sample.

In addition, Ms. Ahern's method of averaging growth rate types more heavily weights certain methods of growth rate estimation than others. The missing data causes Ms. Ahern to over-weight the growth rates of some companies at the expense of others. In the water sample for example, only three Value Line projected EPS growth rates are available. Since these three growth rates are the only ones incorporated into all three components of Ms. Ahern's Composite Growth Estimates, they comprise 41% of the average growth estimate she calculated for the entire sample. In contrast, the Thompson FN/First Call growth rates, which are available for all seven companies in the water sample, constitute less than 29% of Ms. Ahern's average growth rate. In addition, American States Water Co., California Water Service Group, and Philadelphia Suburban Corp.'s

[43] CIWC Exhibit No. 3, Schedule 12, p. 1, Column 5.

growth estimates comprise 77.7% of the water sample growth estimates, even though there are seven companies in Ms. Ahern's Water sample. This is illustrated on Schedule 3.10. Ms. Ahern provides no explanation for her unusual weighting scheme.

The second problem with Ms. Ahern's growth rate estimates is the inclusion of the "BR+SV" growth rates (Schedule 12, columns 3 and 8) among her seven growth rate types. The BR+SV growth estimate introduces circularity in to the estimate of return on common equity "R". Ms. Ahern must first estimate "R" in order to estimate a growth rate using her BR+SV method. The resulting growth estimate is then used in a calculation to estimate the return on common equity "R".

Ms. Ahern's BR+SV method of estimating growth also suffers from 1) the same missing data problem discussed previously; 2) a requirement to estimate four variables, which increases the sources of estimation error four-fold compared to the single source of estimation error when growth is estimated directly; and 3) Ms. Ahern's incorrect substitution of the average return on all equity investment for "R," which should be defined as the return on incremental investment only. The latter is appropriate since "BR+SV" is supposed to measure sustainable growth, which is derived from new investment. Obviously, the average return on all equity investment includes existing assets, which cannot sustain growth beyond their capacity.

CAPM Model

Q. How did Ms. Ahern derive the overall market return she used in her CAPM models?

A. Ms. Ahern averaged two estimates of R_m to derive her estimate. One estimate is the long-term historical total equity earned return rate of 12.2%, as reported by Ibbotson Associates.[44] The other estimate is based on projections reported in *The Value Line Investment Survey*.[45]

For the Value Line estimate, Ms. Ahern added together dividend yield and price appreciation projections in order to estimate R_m. As a proxy for the market portfolio's dividend yield, Ms. Ahern adopted the median of estimated dividend yields (for the next 12 months) of all dividend paying stocks under review in *The Value Line Investment Survey* (2.15%).

For the proxy of expected growth in the market portfolio, Ms. Ahern adopted the geometric average of the Value Line 12-month, 6-month, 3-month, and spot 3-5 year estimated median price appreciation potential of all 1700 stocks in the hypothesized economic environment three to five years hence (16.47%). Those two rates were added together for an R_m of 18.62%.

[44] CIWC Exhibit No. 3, p. 51.
[45] CIWC Exhibit No. 3, Schedule 14, p. 4, note (1).

Q. Please explain the errors in those two approaches and how they may corrupt her CAPM results.

A. Ms. Ahern's Ibbotson-based estimate is based entirely on historical data, the use of which has several shortcomings, as discussed previously.

Ms. Ahern's Value Line-based estimate of the required rate of return on the market contains several errors. First, the median is a biased measure of the aggregate market dividend yield and growth rate. The median of a sample is its middle value; that is, the sample contains as many values above the median as it contains below it. The magnitude of the difference between those other values and the median is not considered. For example, the median of a set comprising 1, 3 and 5 equals 3. The median of a set comprising 1, 3 and 10 also equals 3; although, the highest value in the latter set is double that in the former set.

In particular, the median fails to properly weight the relative value of the securities composing the market portfolio. The common stocks of larger companies have a greater effect on market returns because they constitute a greater proportion of the market than those of smaller companies. Nevertheless, the median growth estimate does not afford higher weights to larger companies, and thus over-weights the contributions of smaller companies, which tend to have greater growth potential.

Ms. Ahern's Value Line-based estimate compounds that problem by improperly drawing the median dividend yield and growth rates from two different samples. The median of estimated dividend yields is derived from dividend paying stocks only. That is, common stocks that do not pay dividends were excluded from the sample from which the median dividend yield was derived. Conversely, the median appreciation projection is an estimate of all stocks in the hypothesized economic environment, dividend paying or not. Obviously the dividend yield of non-dividend paying stocks is 0%. Therefore, the median dividend yield for all common stocks included in *The Value Line Investment Survey* would be lower than that for the subset of common stocks paying dividends. Thus, by adding the higher dividend yield of dividend paying stocks alone to the estimated price appreciation of all stocks, Ms. Ahern over-estimates the overall return on the market.

Q. Please describe the errors in Ms. Ahern's Empirical CAPM analysis.

A. Quantitative research suggests the relationship between risk and return is flatter than the CAPM predicts. The Empirical CAPM attempts to reproduce the observed relationship between risk and realized returns.[46] Since the adjustments to the CAPM that result in the Empirical CAPM are based on empirical testing rather than financial theory, the Empirical CAPM should be applied in a manner that is consistent with the conditions under which it was developed. Specifically, the measure of risk used within the Empirical CAPM must be consistent with that

used in the empirical studies from which the model was developed. Ms. Ahern failed in that regard. The basis of Ms. Ahern's Empirical CAPM is a book entitled *Regulatory Finance: Utilities' Cost of Capital* by Roger A. Morin.[47] That text, in turn, cites another study by Litzenberger, et. al.[48] Litzenberger et. al. adopts raw beta as the measure of risk in its tests of the relationship between risk and realized returns. In contrast, Ms. Ahern applies to both her Traditional and Empirical CAPM models Value Line adjusted betas,[49] rather than the raw betas used in accordance with Litzenberger et. al. Importantly, Litzenberger et. al. suggest that globally adjusted betas,[50] such as those which Value Line publishes, are a solution to the discrepancy between the theoretically predicted and empirically observed relationship between risk and return.[51] In other words, by using adjusted betas, Ms. Ahern has already effectively transformed her "Traditional" CAPM into an empirical CAPM model. Therefore, including an additional beta adjustment in her "Empirical" CAPM model results in inflated estimates of her samples' cost of common equity.

Q. Please demonstrate how Ms. Ahern's use of Value Line betas in her Empirical CAPM inflates her estimate of her sample's cost of common equity.

---

46 CIWC Exhibit No. 3, p. 47.
47 CIWC Exhibit No. 3, p. 47.
48 Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, pp. 369-383.
49 CIWC Exhibit No. 3, Schedule 14, pp. 2 and 3.
50 Litzenberger et. al. refers to betas adjusted in the manner of Merrill Lynch and Value Line as "globally

A. Ms. Ahern's Empirical CAPM can be depicted mathematically as follows:[52]

$$R_j = R_f + 0.25 \times (R_m - R_f) + 0.75 \times \beta_j \times (R_m - R_f)$$

That formula can be restated as follows:

$$R_j = R_f + (0.25 + 0.75 \times \beta_j) \times (R_m - R_f) \qquad (1)$$

Consequently, the Empirical CAPM effectively substitutes a weighted average beta for security *j*'s raw beta. In Ms Ahern's Empirical CAPM, the weighted average beta effectively equals the sum of 0.25 times the market beta of 1.0, and 0.75 times security *j*'s raw beta. Yet, Value Line betas are already adjusted using the following formula:

$$\beta_{Value\ Line} = 0.35 + 0.67 \times \beta_{raw}$$[53]

Substituting the Value Line adjustment formula into the CAPM produces an Empirical CAPM with slightly different parameters:

$$R_j = R_f + (0.35 + 0.67 \times \beta_j) \times (R_m - R_f)$$

---

adjusted."

51 Litzenberger, Ramaswamy and Sosin, "On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital," *Journal of Finance*, May 1980, pp. 375-376.

52 CIWC Exhibit No. 3, Schedule 14, p. 4, note (4).

53 Statman, "Betas compared: Merrill Lynch vs. Value Line," *Journal of Portfolio Management*, Winter 1981, pp. 41-44.

Substituting Value Line betas into Ms. Ahern's Empirical CAPM in place of raw betas increases the weight (compare equations (1) and (2)) of the market beta (where β=1, i.e., the intercept) and reduces the weight of the raw beta:

$$R_j = R_f + (0.51 + 0.50 \times \beta_j) \times (R_m - R_f) \qquad (2)$$

Therefore, including Value Line adjusted betas in Ms. Ahern's Empirical CAPM leads to an overstated estimate of the cost of common equity whenever the raw beta is less than one, since the weight of raw beta is being further reduced in favor of the market beta of 1.0.

Risk Premium Model

Q. Please explain Ms. Ahern's RPM analysis.

A. Ms. Ahern's RPM is essentially an average of two distinct risk premium models for each proxy group.[54] The following formula, derived on Schedule 3.11, depicts Ms. Ahern's RPM model as:

$$R_j = \frac{(R_{A2} + \beta_j \times RP_1) + (R_{A2} + RP_2)}{2}$$

Both models begin with the same "Adjusted Prospective Bond Yield," R_{A2} (7.2%), which, ostensibly, represents the prospective yield on bonds rated A2 by

[54] For presentation purposes, I will only address the proxy group of seven water companies; however, the proxy group of thirteen public utility companies is conceptually the same.

Moody's, the average credit rating of a proxy subgroup of four water companies. To R_{A2}, the first model adds the product of the Value Line adjusted Beta for a different proxy subgroup of three water companies, β_j, (0.63) and the average of the historical and forecasted risk premium estimates, RP_1, (9.2%).[55] The second model[56] adds to R_{A2} an historical risk premium estimate, RP_2, (4.5%). Inputting Ms. Ahern's estimates[57] produces a cost of equity estimate of 12.35% as shown below:

$$\text{Ahern Beta RPM} = (7.2\% + 0.63 \times 9.2\%) = 13.0\%$$

$$\text{Ahern Utility Historical RPM} = (7.2\% + 4.5\%) = 11.70\%$$

$$R_j = \frac{13.0\% + 11.70\%}{2} = 12.35\%$$

Q. Please describe the shortcomings of Ms. Ahern's risk premium model.

A. In addition to the inappropriate use of historical input data, as discussed previously, both of the models incorporated into Ms. Ahern's RPM analysis are also flawed in other respects. The Ahern Beta RPM ($R_{A2} + \beta_j \times RP_1$) is a CAPM derivation that uses biased proxies for the risk-free rate. There are two fundamental flaws to this approach. First, Ms. Ahern improperly applied a market risk premium-based beta to a non-market risk premium. Second, she inappropriately substituted two different long-term corporate bond yields for the risk-free rate within the same risk premium model. The Ahern Utility Historical

[55] Hereafter referred to as the "Ahern Beta RPM."

RPM (R_{A2} + RP_2) is also flawed, due to the improper derivation of the equity risk premium.

Q. Please explain why the application of a market risk premium-based beta to a non-market risk premium is inappropriate.

A. Beta measures a particular type of risk[58] and cannot be assumed to accurately measure any other type of risk. To illustrate, an RPM that is derived from the CAPM but substitutes a corporate bond yield for the risk-free rate ("Beta RPM") can be depicted mathematically as follows:

$$R_{\beta RPMj} = R_{A\text{-}bond} + \beta_j \times (R_m - R_{A\text{-}bond}) \qquad (3)$$

where $R_{\beta RPM} \equiv$ the calculated rate of return for security *j*;
$R_{A\text{-}bond} \equiv$ the A-rated utility bond rate;
$R_m \equiv$ the expected rate of return for the market portfolio; and
$\beta_j \equiv$ the measure of risk for security *j*.

The above model is identical to the CAPM except that it substitutes a risky debt rate, $R_{A\text{-}bond}$, for the risk-free rate, R_f, a substitution which has no basis in financial theory. The CAPM can be expressed as:

$$R_j = (1 - \beta_j) \times R_f + (\beta_j \times R_m)$$

Likewise, the Beta RPM can be rewritten as:

---

[56] Hereafter referred to as the "Ahern Utility Historical RPM."
[57] CIWC Exhibit No. 3, Schedule 13, pp. 1, 6, and 9.
[58] Beta risk is variously labeled "market", "nondiversifiable", or "systematic" risk.

$$R_{\beta RPMj} = (1 - \beta j) \times R_{A\text{-}bond} + (\beta j \times R_m)$$

Since the cost of risky debt, $R_{A\text{-}bond}$, exceeds the risk-free rate, R_f, a comparison of the CAPM and the Beta RPM above makes evident that the latter systematically underestimates the cost of equity for companies with a beta greater than one and overestimates the cost of common equity for all companies with betas less than one. Ms. Ahern's water and utility proxy subgroups have betas below one.[59] Thus, the Beta RPM systematically over-estimates the cost of common equity for those proxy subgroups.

Q. Please explain the consequences of incorporating two different long-term corporate bond yields as substitutes for the risk-free rate in a risk premium model.

A. The first of the two models averaged in Ms. Ahern's risk premium analysis differs slightly from the basic Beta RPM depicted in Equation (3) above in that the Ahern Beta RPM substitutes <u>two</u> different long-term corporate bond yields for the risk-free rate rather than one. Ms. Ahern's implementation of the Beta RPM is shown below:

$$R_{\beta RPMj} = R_{utility\ A2} + \beta j \times (R_m - R_{Corporate\ Aaa})$$

[59] Only three of seven companies in the water proxy group and ten of thirteen companies in the utility proxy group have Value Line betas. Thus, all of Ms. Ahern's analyses that involve Value Line betas (i.e., CAPM, ECAPM, Beta RPM, and CEM), are based on subgroups of her proxy groups.

where $R_{Utility\ A2}$ ≡ Rate of return on A2-rated utility bonds; and.

$R_{Corporate\ Aaa}$ ≡ Rate of return on Aaa-rated corporate bonds.

A fundamental tenet of financial theory states that investors require identical returns from two securities with identical risk. Whenever $R_{Corporate\ Aaa}$ is not equal to $R_{Utility\ A2}$, then a Beta RPM violates that principle. To illustrate, consider a company *j*, whose risk is equal to that of the market ($\beta_m = \beta_j = 1$). Financial theory posits that the expected return on company *j* stock should equal that of the market. Substituting a beta of one into the above formula produces:

$$R_{\beta RPMj} = R_{Utility\ A2} + (R_m - R_{Corporate\ Aaa})$$

Whenever $R_{UtilityA2} = R_{Corporate\ Aaa}$, the above formula will reduce to $R_j = R_m$, which conforms to the aforementioned tenet of financial theory. However, whenever $R_{UtilityA2} \neq R_{Corporate\ Aaa}$, then $R_{\beta RPMj} \neq R_m$. That is, the estimated return for security *j* does not equal the estimated return on the market, although they both have the same risk level ($\beta_m = \beta_j = 1$). Ms. Ahern used an $R_{UtilityA2}$ of 7.2% and an average $R_{Corporate\ Aaa}$ of 6.25%, with an average R_m of 15.4% in the Ahern Beta RPM. This would result in an estimated return ($R_{\beta RPMj}$) of 16.35% for a company with a beta of one (the same as the market), although the estimated market return (R_m) equals 15.4%. Clearly, the Ahern Beta RPM is theoretically untenable. In fact, for companies and proxy groups with a beta less than one, the Ahern Beta RPM will overestimate the cost of equity as long as $R_{UtilityA2}$ exceeds $R_{Corporate\ Aaa}$.

Q. Please explain how the equity risk premium in the Ahern Utility Historical RPM (R_{A2} + RP_2) was improperly derived.

A. To estimate the risk premium for the Ahern Utility Historical RPM (RP_2), Ms. Ahern selected the historical measurement period of 1928-2001.[60] First, Ms. Ahern calculated a market equity risk premium by subtracting the Salomon Brothers Long-Term High Grade Corporate Bond Index yield from the S&P Public Utility Index (11.1% - 6.1% = 5.0%). Next, Ms. Ahern estimated the spread between the Salomon Brothers Long-Term High Grade Corporate Bond Index yield and A rated public utility bonds, to reflect the average rating of the proxy group of seven. To do so, she subtracted the arithmetic mean yields on Aaa and Aa rated bonds (used as a proxy for the Salomon Brothers Long-Term High Grade Corporate Bond Index yield) from the yield on A rated public utility bonds (6.62% - 6.15% = 0.47%, which she rounded to 0.5%). Finally, she calculated an adjusted equity risk premium by subtracting the spread between the Salomon Brothers Long-Term High Grade Corporate Bond Index yield and A rated public utility bonds (0.5%) from the equity risk premium (5.0%).

The adjusted equity risk premium in the Ahern Utility Historical RPM analysis is inappropriate for two reasons. First, it uses historical data, which, as discussed previously, is inappropriate. Second, it is based upon S&P's Public Utility Index, which Ms. Ahern has not demonstrated to be comparable in risk to CIWC.

[60] CIWC Exhibit No. 3, Schedule 13, p. 8.

Comparable Earnings Model

Q. Please describe the shortcomings of Ms. Ahern's comparable earnings analysis.

A. In addition to the use of historical data, Ms. Ahern's CEM suffers several other shortcomings. First, the return estimated by the comparable earnings analysis can be significantly distorted by accounting practices. Second, Ms. Ahern's comparable earnings analysis relies on the erroneous notion that a combination of realized and expected returns on book value ("accounting earnings") is an appropriate estimate for investor-required returns. Third, the two comparable earnings proxy samples have higher average Value Line betas, and are thus riskier, than the samples they are supposed to represent. Finally, the validity of the information from which Ms. Ahern forms her sample is questionable, the reasons for which are discussed below. These shortcomings lead to the conclusion that the comparable earnings model is not an appropriate method for estimating the rate of return for CIWC.

Q. Explain how accounting practices can distort the comparable earnings analysis return estimate.

A. Accounting returns between two companies may not be directly comparable, particularly if those companies are from different industries. Differences in accounting practices can have a significant impact on accounting rate of return.

Because of the sheer numbers involved, i.e., Ms. Ahern's comparison proxy groups consist of 96 and 75 non-utility companies for the water and utility subgroups, respectively; the comparability of the accounting earnings of the CEM non-utility samples to the Ahern water and utility proxy subgroups is highly questionable.

Q. Please explain why returns on book value are inappropriate estimators of investor-required returns.

A. The cost of common equity is the market-required rate of return demanded by investors. In contrast, Ms. Ahern's CEM is not a market-based methodology. The returns Ms. Ahern uses are based on the return on net worth (i.e., book value of common equity) reported in Value Line, rather than the return on market value.[61] The comparable earnings method incorrectly implies that the rate of return on book common equity is equivalent to current investor-required rates of return. There is simply no basis for that implication since the accounting return that the comparable earnings method measures may be more or less than the return investors require from an investment. For example, if the expected return is 20% while the investor-required rate of return is only 10%, investors will bid up the price in the marketplace until the expected returns on market equity equal the required 10% return. The market price of a common stock does not achieve equilibrium until the expected rate of return on the common stock equals the investor required rate of return. In contrast, the return on book value has no such

adjustment mechanism since the denominator, book value, is unresponsive to market forces. Ms. Ahern claims that her CEM model is market-based because she used market-based measures of risk to select the CEM samples.[62] If the required return from Ms. Ahern's CEM model is market based, then the measures of risk should be positively related with the measures of return. However, analysis of Ms. Ahern's data shows that the statistical relationship of her measures of risk with her measures of return is either negative or insignificantly different from zero.

Q. Please provide details about your statement that the two comparable earnings proxy samples have higher average Value Line betas, and are thus riskier, than the samples they are supposed to represent.

A. The CEM sample representing the Water Group has a Value Line beta of 0.72, while the three-company Water Subgroup's Value Line beta is 0.63. The CEM sample representing the Utility Group has a Value Line beta of 0.74, while the Utility Subgroup's Value Line beta is 0.70.[63] Thus, even if accounting earnings were representative of investor return requirements, which they are not, the comparable earnings model would overstate the cost of the equity estimates for both of Ms. Ahern's proxy subgroups.

---

[61] CIWC Exhibit No. 3, pp. 54 and 56.
[62] CIWC Exhibit No. 3, p. 53. For the purpose of this discussion only, I am assuming that Ms. Ahern's standard error of the residual qualifies as a market-based measure of risk (i.e., it measures a type of risk that is reflected in stock prices).
[63] CIWC Exhibit No. 3, Schedule 15, pp. 1-4.

Q. Why is the validity of the information Ms. Ahern used to develop her sample for her CEM analysis questionable?

A. Ms. Ahern used unadjusted betas as one of her criteria in selecting her samples.[64] The unadjusted betas Ms. Ahern presents in CIWC Exhibit No. 3, Schedule 15 cannot be accurate. Value line only publishes its adjusted betas, so the unadjusted betas must be calculated from the adjusted betas. The Value Line adjustment discussed earlier can be applied to the adjusted betas to determine the unadjusted beta by subtracting .35 from the adjusted beta then dividing by .67. Applying the above formula to an adjusted beta of .65 (.625-.674 assuming rounding) result in an unadjusted beta of .4104 to .4836. Ms. Ahern presents numerous adjusted betas of .65 and their corresponding unadjusted betas range from .39 for Libbey Inc.[65] to .47 for Sensient Techn.[66] However, Smucker (J.M.) and Kellogg have adjusted betas of .60 and .70 and an unadjusted betas of .39 and .48,[67] respectively. It is evident that the information provided for Libbey, Inc. and Kellogg is incorrect based upon the formula above. In addition, it is impossible to have two equal unadjusted betas that have different adjusted betas. Since Ms. Ahern would not provide the source document for the

[64] CIWC Exhibit No. 3, pp. 54-55.
[65] CIWC Exhibit No. 3, Schedule 15, p. 1.
[66] CIWC Exhibit No. 3, Schedule 15, p. 4.
[67] CIWC Exhibit No. 3, Schedule 15, pp. 3-4.

Schedule 15,[68] I could not verify the accuracy of all the information Ms. Ahern used in her CEM model.

Q. Has the Commission rejected use of the comparable earnings analysis to measure a utility's cost of equity?

A. Yes. The Commission rejected use of the comparable earnings methodology in Docket Nos. 99-0121, 89-0033, and 92-0448/93-0239 Consol.[69]

Size-based Risk Premium

Q. Is Ms. Ahern's adjustment for a size-based risk premium appropriate?

A. No. First, Ms. Ahern's size-based risk premium has no theoretical basis. Rather, it is based on an empirical study that is not applicable to CIWC. Second, Ms. Ahern inappropriately applied her size-based risk premium to her overall analysis rather than applying it to the CAPM and RPM analyses before averaging in the DCF. Regardless, should a size-based risk premium be adopted, it should be based on the size of CIWC's parent company, Philadelphia Suburban Corporation ("PSC").

Q. Why should the parent company be the basis for a size adjustment?

[68] Staff data request SK 2.05 requested a copy of the source document, the Company's response was:

A. Although CIWC raises its own debt and preferred stock, it obtains common equity financing from its parent company, PSC.[70] PSC has a market capitalization of over $1.6 billion. Being a part of a much larger organization should enhance the ability of CIWC to access the equity market on reasonable terms. When utilities combine, reductions in costs resulting from efficiencies should be passed on to customers in the form of lower rates. Such economies of scale are often advanced to justify utility combinations. Financial capital costs are also subject to economies of scale. If the risk inherent in a utility common stock is a function of that utility's size, then the larger size of PSC should translate into a decreased cost of common equity, in comparison to that of a company the size of CIWC. If a risk premium were based on the size of CIWC, rate payers would be denied the benefits associated with the combined entity's stronger financial profile.

Q. Please explain the significance of the absence of a theoretical basis for a size-based risk premium.

A. Since a size-based risk premium has no theoretical basis, to the extent that a correlation between firm size and return exists, that relationship is likely the result of some other factor or factors that are related to both size and return, such as liquidity or information costs. Relatively illiquid securities impose costs on investors since they may be unable to sell illiquid securities at a fair price on a

---

"Ms. Ahern is unable to provide the entire database".

[69] Order, Docket 99-0121, August 25, 1999, p. 68; Order on Remand, Docket No. 89-0033, November 4, 1991, p. 15; Order, Docket No. 92-0448/93-0239 Consol., October 11, 1994, p. 173.

[70] Company's supplemental responses to data requests SK 1.23 and SK 1.24.

timely basis. The securities of smaller companies tend to be less liquid than those of larger companies since the potential breadth of the market for the former tends to be more limited. In addition, gathering information regarding the expected cash flows and risks of a security imposes costs an investor must recover through the returns that security generates. If fewer sources of information regarding smaller companies exist, then obtaining information might be more expensive.

If the securities of PSC are less liquid or the availability of information regarding PSC is more restricted than the average security, then adding a size-based premium to a CAPM analysis of CIWC's cost of common equity might be proper. However, Ms. Ahern has not provided any evidence to demonstrate that a size premium is warranted for utilities. The study reported in Ibbotson Associates, which forms the basis of Ms. Ahern's size-based risk premium adjustment,[71] is not restricted to utilities. Rather, it is based on the stocks listed on the New York Stock Exchange ("NYSE"), American Stock Exchange ("AMEX"), and National Association of Security Dealers Automated Quotation System ("NASDAQ").[72] In addition, the Brigham text that Ms. Ahern also cites in support of her sized-based premium adjustment does not specifically refer to utility stocks, either. Further, the Brigham text defines a small firm as one with a market capitalization of less than $20 million, which is far below CIWC's $110 million in book capitalization.[73]

[71] CIWC Exhibit No. 3, p. 60 and Company response to Staff Data Request SK 1.06.
[72] Ibbotson Associates, *SBBI 2003 Yearbook*, pp. 136.
[73] CIWC Exhibit No. 3, p. 12 and Company response to Staff Data Request SK 1.05.

Thus, the entire basis of Ms. Ahern's size-based risk premium is questionable at best.

Utilities, unlike most stocks listed on the NYSE, AMEX, or NASDAQ, are subject to uniform reporting requirements. Furthermore, their rates and conditions of service are publicly reported. Therefore, the cost of obtaining information regarding smaller utilities in general, and CIWC in particular, is unlikely to be as high as that of unregulated companies that are similar in size; hence, the application of a size-based premium to a utility is highly questionable.

In fact, in direct contrast with Ms. Ahern's claims, a study by Annie Wong, reported in the Journal of the Midwest Finance Association, specifically found no justification for a size premium for utilities.[74]

Even for non-utilities, evidence of the existence of a size-based risk premium is not very strong. Fernholz found that a statistical property he termed the "crossover effect" was the primary cause of the difference between large and small company stock returns. The "crossover effect" measures the effect on rate of return of those stocks that switch from one size portfolio to another.[75] Fernholz states that as random price changes affect the size of stocks, some stocks cross over from one size portfolio to another. When a stock that starts in

[74] Wong, "Utility Stocks and the Size Effect: an Empirical Analysis," *Journal of the Midwest Finance Association,* 1993.

[75] Fernholz, "Crossovers, Dividends, and the Size Effect," *Financial Analysts Journal*, May/June1998, pp. 73-75.

the large stock portfolio experiences a random negative price change that moves it into the small stock portfolio, its resulting negative return is assigned to, and therefore reduces, the return on the large stock portfolio. Conversely, when that same stock experiences a random positive price change that moves it back into the large stock portfolio, its resulting positive return is assigned to, and therefore increases, the return on the small stock portfolio.[76] The combination of portfolio construction and random (i.e., non-systematic) price movements creates a biased source of measurement error. Thus, the "small stock effect" may be less a market return phenomenon than a modeling problem. That is, the "small stock effect" may be nothing more than a statistical anomaly.

In another study of domestic stocks listed on the NYSE and AMEX, Jensen, Johnson and Mercer, (hereinafter "Jensen") found that small stock premiums appear to be related to monetary policy. Specifically, changes in monetary policy play a prominent role in determining the magnitude of small stock premiums. During expansive monetary periods, defined as months following a reduction in the Federal Reserve discount rate, Jensen found that small stock returns were significantly greater than large stock returns. Conversely, during restrictive monetary periods, defined as months following an increase in the discount rate, Jensen found that small stock returns were not significantly greater than large stock returns.[77] Nevertheless, the applicability of the Jensen results to small

[76] Fernholz, "Crossovers, Dividends, and the Size Effect," *Financial Analysts Journal*, May/June1998, p. 73.

[77] Jensen, Johnson, and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management*, p. 35.

utility stocks is doubtful. First, since the Jensen study was based on largely non-utility companies, its findings that small stocks outperformed large stocks during "expansionary" monetary periods is not surprising. During monetary expansions, as the supply of loanable funds increases, investors are more likely to invest in speculative, small company stocks. However, during monetary contractions, as the supply of loanable funds decreases, investors are more likely to switch from speculative investments to safer ones – the well-known "flight to quality." It is counter-intuitive to claim that investors would consider the smaller firms in the regulated utility sector to be speculative investments; and Ms. Ahern has not supported that premise. Moreover, the Jensen study did not control its measurement of the small stock premium for risk as measured by beta or other means.[78] Therefore, the study does not support Ms. Ahern's size-based risk premium adjustment.

Even if a size-based risk premium exists for utilities, which it does not, Ms. Ahern's estimates of the size of the premium are questionable. First, Ms. Ahern's size-based risk premiums are based on historical returns whose shortcomings as proxies for expected returns were previously addressed.

Second, Ms. Ahern's application of a size-based risk premium, on the basis of Ibbotson Associates' historical size-based risk premiums, is probably inconsistent with the manner in which Ibbotson Associates measured the historical size-based

[78] Jensen, Johnson, and Mercer, "The Inconsistency of Small-Firm and Value Stock Premiums," *Journal of Portfolio Management*, pp. 30 and 34.

risk premiums. While Ms. Ahern adds a size-based premium to her CAPM-based risk premium analysis, which is based on adjusted Value Line betas, the studies I have reviewed on the effect of size on returns employ raw betas.[79] Since the Ibbotson Associates size-based risk premiums are a function of raw beta, Ms. Ahern should have used the same type of betas as Ibbotson Associates.

Q. Has the Commission ruled on a size-based risk premium before?

A. Yes. A size-based risk premium was presented in Consumers Illinois Water rate case Docket No. 97-0351. It was rejected on the basis that the company witness failed to demonstrate that there is a direct relationship between the size of a utility and its risk.[80]

Q. Does this conclude your direct testimony?

A. Yes, it does.

[79] Wong, "Utility Stocks and the Size Effect: an Empirical Analysis," *Journal of the Midwest Finance Association*, 1993, p. 96; Ibbotson, Kaplan and Peterson, "Estimates of Small-Stock Betas Are Much Too Low," *Journal of Portfolio Management*, Summer 1997, p. 106.

[80] Amended Order, Docket No. 97-0351, June 17, 1998, p. 39.

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.01

Consumers Illinois Water Company

Staff's Proposed Weighted Average Cost of Capital

Class of Capital	Future Test Year 2004 Balance	Percent of Total Capital	Cost	Weighted Cost
Short-Term Debt	$ 395,833	0.37%	1.78%	0.01%
Long-Term Debt	$ 52,340,300	48.22%	7.90%	3.81%
Preferred Stock	$ 382,797	0.35%	5.48%	0.02%
Common Equity	$ 55,429,929	51.06%	9.86%	5.03%
Total	$ 108,548,859	100.0%		8.87%

Company's Proposed Weighted Average Cost of Capital

Class of Capital	Future Test Year 2004 Balance	Percent of Total Capital	Cost	Weighted Cost
Short-Term Debt	$ 1,764,583	1.61%	3.25%	0.052%
Long-Term Debt	$ 52,340,302	47.62%	7.90%	3.762%
Preferred Stock	$ 382,797	0.35%	5.48%	0.019%
Common Equity	$ 55,429,929	50.43%	10.75%	5.421%
Total	$ 109,917,611	100.0%		9.25%

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.02

Consumers Illinois Water Company

Balance of Short-term Debt
Average 2004

Date (A)	End of Month Balance: Gross Short-term Debt Outstanding (B)	End of Month Balance: CWIP (C)	End of Month Balance: CWIP Accruing AFUDC (D)	End of Month Balance: Net Short-term Debt Outstanding (E)	Monthly Average (F)
Dec-03	$ 250,000	$ 2,100,000	$ 2,100,000	$ -	
Jan-04	250,000	2,100,000	$ 2,100,000	-	$ -
Feb-04	250,000	2,100,000	$ 2,100,000	-	-
Mar-04	250,000	2,100,000	$ 2,100,000	-	-
Apr-04	750,000	2,100,000	$ 2,100,000	-	-
May-04	1,150,000	2,100,000	$ 2,100,000	-	-
Jun-04	2,100,000	2,100,000	$ 2,100,000	-	-
Jul-04	2,350,000	2,100,000	$ 2,100,000	250,000	125,000
Aug-04	2,600,000	2,100,000	$ 2,100,000	500,000	375,000
Sep-04	2,850,000	2,100,000	$ 2,100,000	750,000	625,000
Oct-04	3,350,000	2,100,000	$ 2,100,000	1,250,000	1,000,000
Nov-04	3,600,000	2,100,000	$ 2,100,000	1,500,000	1,375,000
Dec-04	3,100,000	2,100,000	$ 2,100,000	1,000,000	1,250,000
			Average Balance of Short-Term		**$ 395,833**

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.03

Consumer Illinois Water Company

Embedded Cost of Debt

Line No.	Issue	Date Issued	Maturity Date	Original Principal Amount	Principal Amount Outstanding Average 2004	Unamortized Debt Expense or Discount	Carrying Value	Interest Cost	Annual Amortization of Debt Expense or Discount	Annualized Interest	Embedded Cost
1	FMB Series M-10.40%	12/6/88	12/1/18	$ 6,000,000	$ 6,000,000	$ 86,492	5,913,508	$ 624,000	$ 5,999	629,999	
2	FMB Series N-9.69%	3/15/91	3/1/21	4,500,000	4,500,000	70,660	4,429,340	436,050	4,229	440,279	
3	FMB Series 0-7.63%	9/21/95	9/1/25	8,000,000	8,000,000	59,718	7,940,282	610,400	2,810	613,210	
4	FMB Series P-9.19%	7/24/92	7/15/22	6,000,000	6,000,000	29,200	5,970,800	551,400	1,615	553,015	
5	FMB Series U-5.00%	11/1/02	11/1/32	9,970,000	9,970,000	729,002	9,240,998	498,500	25,579	524,079	
6	FMB Series T-4.90%	11/1/02	11/1/32	2,785,000	2,785,000	202,605	2,582,395	136,465	7,109	143,574	
7	FMB Series S-5.40%	9/1/00	9/30/30	4,500,000	4,500,000	287,044	4,212,956	243,000	10,970	253,970	
8	FMB Series V-6.00%	12/31/03	12/31/33	13,150,000	13,150,000	600,000	12,550,000	789,000	20,000	809,000	
9	Non-Interest Bearing Note	6/17/75		294,924	49,400	-	49,400	-	-	-	
10	Aroma Park-8.00%			1,000,000	1,000,000	-	1,000,000	80,000	-	80,000	
11	Reacquired Debt	Amortization Period				Loss			Loss		
12	Series I - 9.19%	7/24/92	7/15/22	6,000,000	0	93,242	(93,242)	-	5,180	5,180	
13	Tax Exempt - 7.50%	2/1/90	2/1/20	10,000,000	0	626,702	(626,702)	-	39,992	39,992	
14	Series Q - 6.10%	9/21/95	9/1/25	10,000,000	0	646,959	(646,959)	-	31,733	31,733	
15	Series R - 6.00%	9/21/95	9/1/25	2,800,000	0	182,476	(182,476)	-	8,950	8,950	
18	Totals			$ 84,999,924	$ 55,954,400	$ 3,614,100	$ 52,340,300	$ 3,968,815	$ 164,166	$ 4,132,981	7.90%

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.04

Consumers Illinois Water Company

Embedded Cost of Preferred Stock

Preferred Stock Issuance	Dividend Rate	Shares Outstanding	Balance Outstanding	Unamortized Premium	Unamortized Expense	Total Balance	Annual Dividends	Amortization of Expense	Amortization of Discount	Total
Cumulative Preferred	5.50%	4,000	$ 381,200	$ 3,970	$ 2,373	$ 382,797	$ 20,966			$ 20,966

Embeded Cost of Preferred Stock 5.48%

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.05

Consumers Illinois Water Company

Growth Rates

Water Sample

	Company	Zacks Earnings	IBES Earnings	Average
1	American States Water	3.00%	3.00%	3.00%
2	Artesian Resources	8.00%	8.00%	8.00%
3	California Water Services	3.00%	3.00%	3.00%
4	Middlesex Water	7.00%	7.00%	7.00%
5	Philadelphia Suburban Corp.	8.42%	8.80%	8.61%
6	Southwest Water	7.00%	9.00%	8.00%
7	York Water Co.	7.00%	7.00%	7.00%

Utility Sample

	Company	Zacks Earnings	IBES Earnings	Average
1	AGL Resources	6.00%	5.53%	5.77%
2	Consolidated Edison	2.90%	3.16%	3.03%
3	Laclede Group	4.00%	4.00%	4.00%
4	Nicor Inc	5.30%	4.38%	4.84%
5	Northwest Natural Gas	4.56%	4.67%	4.62%
6	NSTAR	4.50%	5.60%	5.05%
7	Piedmont Natural Gas	5.00%	5.00%	5.00%
8	WGL Holdings Inc	3.86%	4.43%	4.15%

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.06

Consumers Illinois Water Company

Water Sample

	Company	Current Dividend $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
1	American States Water	$ 0.221	$ 0.221	$ 0.221	$ 0.221	12/01/03	$ 23.800
2	Artesian Resources	0.193	0.198	0.198	0.198	11/21/03	24.990
3	California Water Services	0.280	0.281	0.281	0.281	11/15/03	25.790
4	Middlesex Water	0.210	0.215	0.215	0.215	09/02/03	25.300
5	Philadelphia Suburban Corp.	0.133	0.140	0.140	0.140	09/01/03	23.270
6	Southwest Water	0.056	0.056	0.056	0.058	10/21/03	13.440
7	York Water Co.	0.130	0.135	0.135	0.135	10/15/03	18.250

Utility Sample

	Company	Current Dividend $D_{0,1}$	$D_{0,2}$	$D_{0,3}$	$D_{0,4}$	Next Dividend Payment Date	Stock Price
1	AGL Resources	$ 0.270	$ 0.270	$ 0.270	$ 0.280	09/01/03	$ 27.590
2	Consolidated Edison	0.555	0.560	0.560	0.560	12/15/03	39.940
3	Laclede Group	0.335	0.335	0.335	0.335	10/01/03	25.740
4	Nicor Inc	0.460	0.460	0.465	0.465	11/01/03	34.090
5	Northwest Natural Gas	0.315	0.315	0.315	0.315	11/15/03	27.870
6	NSTAR	0.530	0.540	0.540	0.540	11/01/03	44.250
7	Piedmont Natural Gas	0.400	0.400	0.415	0.415	10/15/03	37.560
8	WGL Holdings Inc	0.318	0.318	0.320	0.320	11/01/03	26.100

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.07

Consumers Illinois Water Company

Expected Quarterly Dividends

Water Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
American States Water	$0.228	$0.228	$ 0.228	$ 0.228
Artesian Resources	0.198	0.214	0.214	0.214
California Water Services	0.281	0.290	0.290	0.290
Middlesex Water	0.215	0.230	0.230	0.230
Philadelphia Suburban Corp.	0.140	0.150	0.150	0.150
Southwest Water	0.058	0.058	0.058	0.063
York Water Co.	0.135	0.144	0.144	0.144

Utility Sample

Company	$D_{1,1}$	$D_{1,2}$	$D_{1,3}$	$D_{1,4}$
AGL Resources	$0.280	$ 0.280	$ 0.280	$ 0.296
Consolidated Edison	0.560	0.577	0.577	0.577
Laclede Group	0.335	0.335	0.335	0.335
Nicor Inc	0.465	0.465	0.488	0.488
Northwest Natural Gas	0.330	0.330	0.330	0.330
NSTAR	0.540	0.567	0.567	0.567
Piedmont Natural Gas	0.415	0.415	0.436	0.436
WGL Holdings Inc	0.320	0.320	0.333	0.333

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.08

Consumers Illinois Water Company

DCF- Cost of Common Equity Estimate

Water Sample

	Company	Cost of Equity Estimate
1	American States Water	6.91%
2	Artesian Resources	11.49%
3	California Water Services	7.58%
4	Middlesex Water	10.79%
5	Philadelphia Suburban Corp.	11.30%
6	Southwest Water	9.83%
7	York Water Co.	10.25%
	Average	9.74%

Utility Sample

	Company	Cost of Equity Estimate
1	AGL Resources	10.11%
2	Consolidated Edison	8.91%
3	Laclede Group	9.44%
4	Nicor Inc	10.66%
5	Northwest Natural Gas	9.50%
6	NSTAR	10.32%
7	Piedmont Natural Gas	9.72%
8	WGL Holdings Inc	9.33%
	Average	9.75%

Docket No. 03-0403
ICC Staff Exhibit 3.0
Schedule 3.09

Consumers Illinois Water Company

Risk Premium Analysis

Interest Rates as of August 11, 2003

U.S. Treasury Bills		U.S. Treasury Bonds	
Discount Rate	Effective Yield	Bond Equivalent Yield	Effective Yield
0.94%	0.96%	5.43%	5.50%

Risk Premium Cost of Equity Estimates*

Water Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
5.50%	+	0.500	*	(13.66% - 5.50%)	=	9.58%

Utility Sample

Risk-Free Rate		Beta		Risk Premium		Cost of Common Equity
5.50%	+	0.595	*	(13.66% - 5.50%)	=	10.36%

*Risk-Free Rate Proxy is the U.S. Treasury Bond

Consumers Illinois Water Company

Analysis of Ahern's Growth Rates

		Weight			
Central Tendency	Company	Range of Growth Rates 25.0%	Average of all Growth Rates 25.0%	Average of Projected EPS Growth Rates 50.0%	Composite 100.0%
Water Sample					
VL Historical DPS		0.0%	14.3%		3.6%
American State Water	14.3%	0.0%	2.0%	0.0%	0.5%
Artesian Resources	14.3%	0.0%	2.0%	0.0%	0.5%
California Water Service	14.3%	0.0%	2.0%	0.0%	0.5%
Middlesex Water Company	14.3%	0.0%	2.0%	0.0%	0.5%
Philadelphia Suburban	14.3%	0.0%	2.0%	0.0%	0.5%
Southwest Water	14.3%	0.0%	2.0%	0.0%	0.5%
York Water	14.3%	0.0%	2.0%	0.0%	0.5%
VL Historical EPS		0.0%	14.3%		3.6%
American State Water	25.0%	0.0%	3.6%	0.0%	0.9%
Artesian Resources	25.0%	0.0%	3.6%	0.0%	0.9%
California Water Service	0.0%	0.0%	0.0%	0.0%	0.0%
Middlesex Water Company	0.0%	0.0%	0.0%	0.0%	0.0%
Philadelphia Suburban	25.0%	0.0%	3.6%	0.0%	0.9%
Southwest Water	0.0%	0.0%	0.0%	0.0%	0.0%
York Water	25.0%	0.0%	3.6%	0.0%	0.9%
Historical BR+VS		0.0%	14.3%		3.6%
American State Water	14.3%	0.0%	2.0%	0.0%	0.5%
Artesian Resources	14.3%	0.0%	2.0%	0.0%	0.5%
California Water Service	14.3%	0.0%	2.0%	0.0%	0.5%
Middlesex Water Company	14.3%	0.0%	2.0%	0.0%	0.5%
Philadelphia Suburban	14.3%	0.0%	2.0%	0.0%	0.5%
Southwest Water	14.3%	0.0%	2.0%	0.0%	0.5%
York Water	14.3%	0.0%	2.0%	0.0%	0.5%
VL Projected DPS		50.0%	14.3%		16.1%
American State Water	33.3%	16.7%	4.8%	0.0%	5.4%
Artesian Resources	0.0%	0.0%	0.0%	0.0%	0.0%
California Water Service	33.3%	16.7%	4.8%	0.0%	5.4%
Middlesex Water Company	0.0%	0.0%	0.0%	0.0%	0.0%
Philadelphia Suburban	33.3%	16.7%	4.8%	0.0%	5.4%
Southwest Water	0.0%	0.0%	0.0%	0.0%	0.0%
York Water	0.0%	0.0%	0.0%	0.0%	0.0%

		Weight			
Central Tendency	Company	Range of Growth Rates 25.0%	Average of all Growth Rates 25.0%	Average of Projected EPS Growth Rates 50.0%	Composite 100.0%
VL Projected EPS		50.0%	14.3%	50.0%	41.1%
American State Water	33.3%	16.7%	4.8%	16.7%	13.7%
Artesian Resources	0.0%	0.0%	0.0%	0.0%	0.0%
California Water Service	33.3%	16.7%	4.8%	16.7%	13.7%
Middlesex Water Company	0.0%	0.0%	0.0%	0.0%	0.0%
Philadelphia Suburban	33.3%	16.7%	4.8%	16.7%	13.7%
Southwest Water	0.0%	0.0%	0.0%	0.0%	0.0%
York Water	0.0%	0.0%	0.0%	0.0%	0.0%
Thompson/First Call		0.0%	14.3%	50.0%	28.6%
American State Water	14.3%	0.0%	2.0%	7.1%	4.1%
Artesian Resources	14.3%	0.0%	2.0%	7.1%	4.1%
California Water Service	14.3%	0.0%	2.0%	7.1%	4.1%
Middlesex Water Company	14.3%	0.0%	2.0%	7.1%	4.1%
Philadelphia Suburban	14.3%	0.0%	2.0%	7.1%	4.1%
Southwest Water	14.3%	0.0%	2.0%	7.1%	4.1%
York Water	14.3%	0.0%	2.0%	7.1%	4.1%
Projected BR+VS		0.0%	14.3%		3.6%
American State Water	33.3%	0.0%	4.8%	0.0%	1.2%
Artesian Resources	0.0%	0.0%	0.0%	0.0%	0.0%
California Water Service	33.3%	0.0%	4.8%	0.0%	1.2%
Middlesex Water Company	0.0%	0.0%	0.0%	0.0%	0.0%
Philadelphia Suburban	33.3%	0.0%	4.8%	0.0%	1.2%
Southwest Water	0.0%	0.0%	0.0%	0.0%	0.0%
York Water	0.0%	0.0%	0.0%	0.0%	0.0%
All Methods					
American State Water					26.2%
Artesian Resources					6.0%
California Water Service					25.3%
Middlesex Water Company					5.1%
Philadelphia Suburban					26.2%
Southwest Water					5.1%
York Water					6.0%

Ahern Risk Premium Model

Ms. Ahern averages the results from two distinct risk premium models ("RPMs") to develop her cost of equity estimate. The formulas for the two RPM's Ms. Ahern uses are:

Ahern Beta RPM = $(R_{A2} + \beta_j \times RP_1)$ and;

Ahern Utility Historical RPM = $(R_{A2} + RP_2)$

Ms. Ahern's RPM for (for the proxy group of seven water companies) can be depicted mathematically as follows:[1]

$$R_j = R_{A2} + \{[b_j \times (R_{m1} - R_{Aa/Aaa}) + (R_{m2} - R_{A\text{-}bond})] / 2\}$$

where
- $R_j \equiv$ the required rate of return for security *j*;
- $R_{A2} \equiv$ a derived estimate of the yield on a long-term bond rated A2 by Moody's;
- $R_{m1} \equiv$ average of historical and projected estimates of the overall market return;
- $R_{m2} \equiv$ S&P's public utility index return (1928-2001);
- $R_{Aa/Aaa} \equiv$ average of historical return on long-term high-grade corporate bonds and a prospective yield on Aaa rated corporate bonds;
- $R_{A\text{-}bond} \equiv$ derived historical estimate yield on an A rated bond; and
- $b_j \equiv$ the measure of risk for security *j*.

That formula can be restated as follows:

$$2R_j = 2R_{A2} + [b_j \times (R_{m1} - R_{Aa/Aaa})] + [(R_{m2} - R_{A\text{-}bond})]$$

$$2R_j = [R_{A2} + b_j \times (R_{m1} - R_{Aa/Aaa})] + [R_{A2} + (R_{m2} - R_{A\text{-}bond})]$$

$$R_j = \{[R_{A2} + b_j \times (R_{m1} - R_{Aa/Aaa})] + [R_{A2} + (R_{m2} - R_{A\text{-}bond})]\} / 2$$

$$R_j = [(R_{A2} + b_j \times RP_1) + (R_{A2} + RP_2)] / 2$$

Where: $RP_1 = R_{m1} - R_{Aa/Aaa}$; and

$RP_2 = R_{m2} - R_{A\text{-}bond}$

[1] See CIWC Exhibit No. 3, Schedule 14, p. 1, 4, 5, 6, and 8.